CLAIMS

1. An imaging device including a back-thinned silicon focal plane array, the improvement comprising positioning an up-converter layer on the front surface of said backside-thinned focal plane array.

2. A CCD with improved wavelength response comprising a back-thinned silicon surface layer, a focal plane array and an up-conversion layer positioned on the front surface of said array.

3. A CMOS imaging device with improved wavelength response comprising a back-thinned silicon surface layer, a focal plane array and an up-conversion layer positioned on the front surface of said focal plane array.

4. An imaging device in accordance with claim 3 in which a said back-thinned silicon surface layer is positioned in a package facing a photocathode across a vacuum and in which said up-conversion layer is selected to detect wavelengths in the range of ~1000 to ~2000 nanometers.

5. An imaging device in accordance with claim 4 in which the CMOS includes active pixel sensors.

6. An imaging device in accordance with claim 4 in which the CMOS includes passive pixel sensors.

7. An imaging device in accordance with claim 4 in which the photocathode comprises GaAs.

8. An imaging device in accordance with claim 1 including an up-converter layer on the front surface of the back-thinned silicon focal plane array comprising a phosphor.

9. An imaging device in accordance with claim 8 in which the up-converting layer comprises two distinct phosphor layers, each having different wavelength responses.

10. An imaging device in accordance with claim 1 including a transparent cap overlying the up-converting material and said focal plane array.

11. An imaging device in accordance with claim 10 including a reflective layer adjacent to said transparent cap to reflect image information to said focal plane array.

12 An imaging device in accordance with claim 1 in which the focal plane array comprises a CMOS device.

13. A sensor in accordance with claim 12 in which a photocathode is spaced by a vacuum from said CMOS device with said photocathode facing said silicon surface layer of said CMOS device.

14. A sensor in accordance with claim 8 in which the output of the focal plane array is displayed as false colors.

15 The sensor of claim 1 in which the phosphor enables detection of an aiming beam at ~1.5 microns.

16. The sensor in accordance with claim 1 in which the up converter comprises a material having a sensitivity to light in the range of 1100 to 2000 nm and the capability to re-emit light in the 400-1100 nm range.

17. The method of extending the sensitivity of a back-thinned silicon layer of a focal plane array comprising placing an up-converting layer on the front surface of said focal plane array.

18. The method of claim 17 in which said focal plane array comprises active pixel sensors of a CMOS device.

19. The method of claim 17 in which pixels of said focal plane array are covered with up-conversion material in a predetermined pattern to create a sensor that outputs a signal that can be displayed in a false color image.

20. A sensor in accordance with claim 14 in which pixels of said focal plane array are coated in a predetermined pattern with an up-conversion material.

21. A sensor in accordance with claim 1 comprising at least a first type of up-conversion material positioned coating a fraction of the pixels of said imaging device.

22. A sensor in accordance with claim 21 in which another up-conversion material is positioned coating another fraction of the pixels of said imaging device in a predetermined pattern and in a pattern that differs from the pattern covered by said first type of up-conversion material.

23. A sensor in accordance with claim 1 including filters positioned covering a fraction of the pixels of said focal plane array in a regular pattern.

24. A sensor in accordance with claim 1 comprising a first coating of a fraction of the pixels with a first type of up-conversion material and an uncoated second fraction of the pixels are in a regular pattern.

25.. A sensor in accordance with claim 1 in which filters are deposited on a fraction of the pixels in a predetermined pattern.

26. A sensor in accordance with claim 25 in which the filter comprises aluminum.

27. A sensor in accordance with claim 14 in which said phosphor is coated on a stacked photodiode pixilated sensor such that the output of the focal plane array can be displayed as a false-color image.